WHAT IS CLAIMED IS:

1. A method for extracting individual images from a medium, comprising the steps of:

(a) scanning the medium at a relatively low resolution to generate a low-resolution digital representation of the medium and the individual images thereon;

(b) processing the low-resolution digital representation by:

(b)(1) defining borders of the medium, such that all of the individual images are within the defined borders;

(b)(2) applying a smoothen filter to the low-resolution representation;

(b)(3) detecting edges of each area containing at least one image;

(b)(4) determining, and if necessary correcting, the orientation of the medium; and

(b)(5) locating each of the individual images within its corresponding area in the medium; and

(c) generating an index of all individual images identified on the medium.

2. The method of claim 1, further comprising the steps of:

(d) selecting one or more of the individual images from the index;

(e) re-scanning each of the selected individual images at a relatively high resolution; and

(f) generating a high-resolution output of each of the selected individual images.

3. The method of claim 1, wherein the medium comprises at least one of negative film, positive film, and slides.

4. The method of claim 1, wherein the index comprises a collection of thumbnail images.

5. A method for extracting individual images from a medium contained in a holder having image-holding areas, comprising the steps of:

(a) scanning the medium and the holder at a relatively low resolution to generate a low-resolution digital representation of the holder and the medium including the individual images thereon;

(b) processing the low-resolution digital representation by:

(b)(1) defining borders of the holder, such that all of the image-holding areas and all of the individual images contained therein are within the defined borders;

(b)(2) applying a smoothen filter to the low-resolution representation;

(b)(3) detecting edge segments of the image-holding areas;

(b)(4) detecting and identifying each of the image-holding areas;

(b)(5) determining the orientation of at least one image-holding area with respect to a reference, and

(b)(5)(i) if it is determined that the at least one image-holding area is skewed with respect to the reference, correcting the orientation of the at least one image-holding area; and

(b)(6) locating each of the individual images within the image-holding areas; and

(c) generating an index of all individual images identified on the medium.

6. The method of claim 5, further comprising the steps of:

(d) selecting one or more of the individual images from the index;

(e) re-scanning each of the selected individual images at a relatively high resolution; and

(f) generating a high-resolution output of each of the selected individual images.

7. The method of claim 5, wherein the medium comprises at least one of negative film, positive film, and slides.

8. The method of claim 5, wherein the index comprises a collection of thumbnail images.

9. The method of claim 5, wherein step (b)(1) comprises darkening pixels in, or within a predetermined distance from, the outer-most row/column of pixels representing the holder.

10. The method of claim 5, wherein the low-resolution digital representation is a RGB color representation, and wherein step (b)(2) comprises applying the smoothen filter to only the R data of each pixel in the low-resolution representation.

11. The method of claim 10, wherein each output pixel of the smoothen filter is determined by the weighted average of the pre-filtered version of that pixel and each of the pixels in a pre-defined neighborhood.

12. The method of claim 5, wherein step (b)(3) comprises reducing the low-resolution representation to binary data, and then reducing the binary data to boundaries of the image-holding areas.

13. The method of claim 5, wherein step (b)(3) comprises applying an edge detector to the low-resolution representation, wherein each output pixel of the edge detector is determined by a pre-defined edge-detecting-filter kernel, and then applying a threshold test to each output pixel to determine whether that output pixel is above or below a pre-determined threshold, and making that output pixel either a 1 or a 0 based on the result of the threshold test.

14. The method of claim 5, wherein step (b)(4) comprises distinguishing the detected edge segments of the image-holding areas from all artifacts that resemble an image-holding-area edge segment, identifying groups of connected edge segments, and identifying each of the image-holding areas from the size and shape of the corresponding group of connected edge segments.

15. The method of claim 5, wherein step (b)(5) comprises computing the rotation angle of the at least one image-holding area with respect to the reference by computing the Hough transform of a representative line drawing of that image-holding area.

16. The method of claim 5, wherein step (b)(5) comprises computing the rotation angle of each image-holding area with respect to the reference by computing the Hough transform of a representative line drawing of that image-holding area.

17. The method of claim 5, wherein step (b)(6) comprises identifying boundaries of the medium in each of the identified image-holding areas.

18. The method of claim 17, wherein step (b)(6) further comprises identifying boundaries of each individual image.

19. An apparatus for extracting individual images from a medium contained in a holder having image-holding areas, comprising:

a scanner for scanning the medium and the holder at a relatively low resolution to generate a low-resolution digital representation of the holder and the medium including the individual images thereon;

a storage medium in communication with the scanner for storing the low-resolution representation;

means in communication with the storage medium for processing the low-resolution digital representation, the processing means including:

means for defining borders of the holder, such that all of the image-holding areas and all of the individual images contained therein are within the defined borders;

means for applying a smoothen filter to the low-resolution representation;

means for detecting edge segments of the image-holding areas;

means for detecting and identifying each of the image-holding areas;

means for determining the orientation of at least one image-holding area with respect to a reference, and, if it is determined that the at least one image-holding area is skewed with respect to the reference, for correcting the orientation of the at least one image-holding area; and

means for locating each of the individual images within the image-holding areas; and

means for generating an index of all individual images identified on the medium.

20. The apparatus of claim 19, further comprising:

means for selecting one or more of the individual images from the index;

wherein the scanner re-scans each of the selected individual images at a relatively high resolution; and

means for generating a high-resolution output of each of the selected individual images.

21. The apparatus of claim 19, wherein the medium comprises at least one of negative film, positive film, and slides.

22. The apparatus of claim 19, wherein the index comprises a collection of thumbnail images.

23. The apparatus of claim 19, wherein the border-defining means darkens pixels in, or within a predetermined distance from, the outer-most row/column of pixels representing the holder.

24. The apparatus of claim 19, wherein the low-resolution digital representation is a RGB color representation, and wherein the smoothen filter applying means applies the smoothen filter to only the R data of each pixel in the low-resolution representation.

25. The apparatus of claim 24, wherein each output pixel of the smoothen filter is determined by the weighted average of the pre-filtered version of that pixel and each of the pixels in a pre-defined neighborhood.

26. The apparatus of claim 19, wherein the edge-segments-detecting means reduces the low-resolution representation to binary data, and then reducing the binary data to boundaries of the image-holding areas.

27. The apparatus of claim 19, wherein the edge-segments-detecting means applies an edge detector to the low-resolution representation, wherein each output pixel of the edge detector is determined by a pre-defined edge-detecting-filter kernel, and then applying a threshold test to each output pixel to determine whether that output pixel is above or below a pre-determined threshold, and making that output pixel either a 1 or a 0 based on the result of the threshold test.

28. The apparatus of claim 19, wherein the detecting and identifying means distinguishes the detected edge segments of the image-holding areas from all artifacts that resemble an image-holding-area edge segment, identifying groups of connected edge segments, and identifying each of the image-holding areas from the size and shape of the corresponding group of connected edge segments.

29. The apparatus of claim 19, wherein the orientation-determining-and-correcting means computes the rotation angle of the at least one image-holding area with respect to the reference by computing the Hough transform of a representative line drawing of that image-holding area.

30. The apparatus of claim 19, wherein the orientation-determining-and-correcting means computes the rotation angle of each image-holding area with respect to the reference by computing the Hough transform of a representative line drawing of that image-holding area.

31. The apparatus of claim 19, wherein the locating means identifies boundaries of the medium in each of the identified image-holding areas.

32. The apparatus of claim 31, wherein the locating means further identifies boundaries of each individual image.

33. A machine-readable medium having a program of instructions for directing a machine to extract images from a medium, the program of instructions comprising instructions for:

(a) scanning the medium at a relatively low resolution to generate a low-resolution digital representation of the medium and the individual images thereon;

(b) processing the low-resolution digital representation by:

(b)(1) defining borders of the medium, such that all of the individual images are within the defined borders;

(b)(2) applying a smoothen filter to the low-resolution representation;

(b)(3) detecting edges of each area containing at least one image;

(b)(4) determining, and if necessary correcting, the orientation of the medium; and

(b)(5) locating each of the individual images within its corresponding area in the medium; and

(c) generating an index of all individual images identified on the medium.

34. The machine-readable medium of claim 33, further comprising instructions for:

(d) selecting one or more of the individual images from the index;

(e) re-scanning each of the selected individual images at a relatively high resolution; and

(f) generating a high-resolution output of each of the selected individual images.

35. The machine-readable medium of claim 33, wherein the medium comprises at least one of negative film, positive film, and slides.

36. The machine-readable medium of claim 33, wherein the index comprises a collection of thumbnail images.

37. A machine-readable medium having a program of instructions for directing a machine to extract individual images from a medium contained in a holder having image-holding areas, comprising instructions for:

(a) scanning the medium and the holder at a relatively low resolution to generate a low-resolution digital representation of the holder and the medium including the individual images thereon;

(b) processing the low-resolution digital representation by:

(b)(1) defining borders of the holder, such that all of the image-holding areas and all of the individual images contained therein are within the defined borders;

(b)(2) applying a smoothen filter to the low-resolution representation;

(b)(3) detecting edge segments of the image-holding areas;

(b)(4) detecting and identifying each of the image-holding areas;

(b)(5) determining the orientation of at least one image-holding area with respect to a reference, and

(b)(5)(i) if it is determined that the at least one image-holding area is skewed with respect to the reference, correcting the orientation of the at least one image-holding area; and

(b)(6) locating each of the individual images within the image-holding areas; and

(c) generating an index of all individual images identified on the medium.

38. The machine-readable medium of claim 37, further comprising instructions for:

(d) selecting one or more of the individual images from the index;

(e) re-scanning each of the selected individual images at a relatively high resolution; and

(f) generating a high-resolution output of each of the selected individual images.

39. The machine-readable medium of claim 37, wherein the medium comprises at least one of negative film, positive film, and slides.

40. The machine-readable medium of claim 37, wherein the index comprises a collection of thumbnail images.

41. The machine-readable medium of claim 37, wherein instruction (b)(1) comprises darkening pixels in, or within a predetermined distance from, the outer-most row/column of pixels representing the holder.

42. The machine-readable medium of claim 37, wherein the low-resolution digital representation is a RGB color representation, and wherein instruction (b)(2) comprises applying the smoothen filter to only the R data of each pixel in the low-resolution representation.

43. The machine-readable medium of claim 42, wherein each output pixel of the smoothen filter is determined by the weighted average of the pre-filtered version of that pixel and each of the pixels in a pre-defined neighborhood.

44. The machine-readable medium of claim 37, wherein instruction (b)(3) comprises reducing the low-resolution representation to binary data, and then reducing the binary data to boundaries of the image-holding areas.

45. The machine-readable medium of claim 37, wherein instruction (b)(3) comprises applying an edge detector to the low-resolution representation, wherein each output pixel of the edge detector is determined by a pre-defined edge-detecting-filter kernel, and then applying a threshold test to each output pixel to determine whether that output pixel is above or below a pre-determined threshold, and making that output pixel either a 1 or a 0 based on the result of the threshold test.

46. The machine-readable medium of claim 37, wherein instruction (b)(4) comprises distinguishing the detected edge segments of the image-holding areas from all artifacts that resemble an image-holding-area edge segment, identifying groups of connected edge segments, and identifying each of the image-holding areas from the size and shape of the corresponding group of connected edge segments.

47. The machine-readable medium of claim 37, wherein instruction (b)(5) comprises computing the rotation angle of the at least one image-holding area with

respect to the reference by computing the Hough transform of a representative line drawing of that image-holding area.

48. The machine-readable medium of claim 37, wherein instruction (b)(5) comprises computing the rotation angle of each image-holding area with respect to the reference by computing the Hough transform of a representative line drawing of that image-holding area.

49. The machine-readable medium of claim 37, wherein instruction (b)(6) comprises identifying boundaries of the medium in each of the identified image-holding areas.

50. The machine-readable medium of claim 49, wherein instruction (b)(6) further comprises identifying boundaries of each individual image.

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